Scaling access to energy in rural areas: a market-based approach

Presented by SNV Tanzania to South Africa

3rd National Biogas Conference-2nd Nov 2017
Outline:

• Introduction of the Programme
• Type and sizes of Digesters
• Motivation for selection of working areas
• Key elements to move domestic biogas forward
• Expected results
• Challenges
• Conclusions
Africa Biogas Partnership Programme II

Overall objective: To improve living conditions of households in five African countries, through the multiple benefits of the introduction of an additional 100,000 domestic biogas digesters for cooking and lighting.

Main funding: DGIS  Fund management: Hivos  TA: SNV
What is Domestic Biogas Technology?

- Design: fixed dome (6-13m³)
- Local materials & resources
- Feeding: livestock manure & human excreta (> 20 kg daily)
- Investment cost Tanzania: USD 400-900
- Life: > 30 years
- Gas use: cooking & lighting
- Bio-slurry: organic fertiliser
Cattle rearing households in Tanzania

Regional number of cattle rearing households with 1-10 cattle in Tanzania.

Number of biodigesters installed per region in Tanzania at the end of 2014.

Source: TDBP, 2015.
Multiple Benefits of a Bio-digester
Tanzania Domestic Biogas Programme

Key elements to move biogas forward:

- Proper selection of beneficiaries
- Building capacities of local actors, aimed at the development of a commercially viable, market oriented biogas sector.
- Realistic production targets, aiming to develop the whole sector (project -> national programme -> sector).
- Multi-stakeholder approach involving private sector, civil society and government organisations.
- Continuous, long-term focus on customers’ satisfaction, commercialisation, sustainability and maximizing benefits (including use of bioslurry, gender-focus).
Programme functions

Functions required for national programmes on domestic biogas

- Promotion
- Training
- R&D
- Q-Control
- Operation & maintenance
- Construction & after sales service
- Credit
- Coordination/implementation
- Coordination/policy level
- Extension
- M&E
TDBP: Implementation Structure

Programme Support

- CAMARTEC
- National Biogas Steering Committee
- Ministries & Government agencies
- Institutional partnerships
- MIGESADO
- FIDE
- ELCT
- KDA
- NRCF
- Caritas
- OTHER

Implementing Partners

Private sector associations

Enterprises: digester construction, appliance provision and after sales services

Biogas

MFIs

Customers: invest to have access to energy
**Tanzania Biogas Programme**

### Expected results (provisional)

<table>
<thead>
<tr>
<th>Category</th>
<th>Expected Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biogas plant construction</strong></td>
<td>12,000</td>
<td>[plants]</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy production</td>
<td>110,222</td>
<td>[MWh]</td>
</tr>
<tr>
<td>Power installed</td>
<td>30,799</td>
<td>[kW]</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GHG emission reduction</td>
<td>60,101</td>
<td>[t CO₂ eq]</td>
</tr>
<tr>
<td>Deforestation reduction</td>
<td>7,954</td>
<td>[ha of forest]</td>
</tr>
<tr>
<td>Soil nutrition</td>
<td>64,909</td>
<td>[t(DM) bio-slurry]</td>
</tr>
<tr>
<td><strong>Fuel substitution</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biomass</td>
<td>98,952</td>
<td>[t biomass]</td>
</tr>
<tr>
<td>Fossil fuel</td>
<td>817</td>
<td>[t]</td>
</tr>
<tr>
<td><strong>Socio-economic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persons reached</td>
<td>72,000</td>
<td>[persons]</td>
</tr>
<tr>
<td>Workload reduction (women &amp; children)</td>
<td>2,003</td>
<td>[pers years]</td>
</tr>
<tr>
<td>Exposure to indoor air pollution reduced</td>
<td>60,000</td>
<td>[women &amp; children]</td>
</tr>
<tr>
<td>Toilets attached</td>
<td>2,400</td>
<td>[toilets]</td>
</tr>
<tr>
<td>Productive slurry use</td>
<td>9,600</td>
<td>[households]</td>
</tr>
<tr>
<td>Employment generation (direct)</td>
<td>840</td>
<td>[person years]</td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>User training</td>
<td>16,800</td>
<td>[person days]</td>
</tr>
<tr>
<td>Professional training</td>
<td>5,142</td>
<td>[person days]</td>
</tr>
</tbody>
</table>
Private Sector Development

- More than 8,000 hh benefited from biogas
- >400 masons trained from start of the program (2009).
- From 2011, > 60 Biogas Construction Enterprises (BCEs) created throughout the country.
- BCEs are trained on technical skills and business skills, including after-sales services, marketing and financial management.
- BCE associations being strengthened to represent sector interests.
- BCEs account for 77.5% of digester construction in Tanzania (2016).
- Promote linkages between BCEs and SACCOS/MFIs to increase production.
Biogas Business Boost Benefiting Farmers (4B-F)
Part of the EnDev RBF portfolio funded by DFID

Overall goal: To overcome market barriers constraining private sector delivery of biogas technologies and services providing modern energy and agricultural solutions to the poor.

1. **Micro Finance Institutions** - benefiting from result based Credit Sanctioning Incentives to mitigate financing challenges in the uptake of domestic biogas technology.

2. **Biogas Construction Enterprises** - benefiting from result based Quality Product Incentives to improve bio-digester functionality through after sales services. Incentives are disbursed after independent verification through a

3. **Customer Service Centre** (CSC, operated by Technobrain).
   • Customer registration, plant commissioning and after-sales service reports are uploaded on on-line database via mobile phone app.
   • CSC verifies with customers and communicates with TDBP for repairs, lead follow-up, etc. (15% site verification).
4B-F Theory of Change

Biogas programme teams + Implementation service providers + Stakeholder engagement

Plant functionality incentive

Credit sanctioning incentive

Biogas sector

Improved technology functionality

Increased affordability

Accelerated uptake of domestic biogas

Boosted socio-economic benefits for smallholder farmers
CSC verification

CSC

TDBP monitoring system

Farming
Farming
Farming Household

PCR
ARDC
ARDC
ARDC
ARDC
TDBP challenges /barriers to Project implementation

**Affordability**
- Investment subsidy
- Investment costs
- Credit availability

**Reputation**
- Functionality
- Quality
- Integrity of products / services and actors in the sector

**Programme mgmt**
- Drive / ownership
- Credibility
- Relevance
- Implementing modalities
- Capacity (mgt / fin)

**Business case / benefits**
- Demand: market pull vs programme push
- Energy and agriculture
- Supply: attractiveness, growth, margins
- Value chain linkages
- Business case for farmer / BCE / MFI

**PRODUCTION**
Conclusions:

Hh Biodigesters:  
- Creates jobs in many ways  
- Increase productivity (cash/food crops)  
- Protect our environment  
- Protect our people - clean energy and safe food  
- Create space for building sustainable communities  
- In the end there is “balancing benefits”
Asante sana!

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